

CHILD TEMPERAMENT AND MATERNAL BEHAVIOR:
EFFECTS ON CHILDREN'S BEHAVIOR DURING ANESTHESIA INDUCTION

By

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This study explored children's adjustment to anesthesia induction and how this is related to temperament factors. Additionally, the relationship between maternal characteristics and children's behavioral adjustment to anesthesia induction was investigated.

Sixty mother-child dyads were interviewed in the Ear, Nose, Throat Clinic waiting room at the J. Hillis Miller Health Center, Gainesville, Florida. Mothers completed the Parent Temperament Questionnaire regarding their child's temperament. Mothers and children were then escorted to a clinic examination room. A videotape recording was made of the waiting period before the doctor entered the examination room. Videotapes were subsequently scored using the Dyadic Prestressor Interaction Scale. On the day of surgery an observer met the child and parent in the

pre-operative holding room. The observers used the Operating Room Behavior Rating Scale-Revised to rate the number of distress behaviors and level of cooperation during the anesthesia induction procedure. Children's heart rate was recorded as soon as the electrodes were attached.

Only a limited number of temperament factors and maternal behaviors were directly related to children's adjustment to anesthesia induction. Instead, temperament variables including approach/withdrawal, and the overall temperament score in interaction with the maternal behaviors of ignoring, restraint, reassuring, agitation and distraction were the best predictors of children's behavior during anesthesia induction. Both difficult and easy temperament children displayed a higher number of distress behaviors and had higher heart rate levels depending on maternal behavior. The difficult child was adversely affected by less ignoring, restraint and agitation, more reassurance and varying amounts of distraction. In contrast, the easy child was adversely affected by high rates of ignoring, restraint and agitation, less reassurance and varying amounts of distraction. These findings support the view that maternal behaviors cannot be judged as either "good" or "bad." Rather it appears that a "goodness of fit" or "poorness of fit" exists between dyads in different situations. Implications of these results

with regard to possible interventions are discussed.

CHAPTER I INTRODUCTION

Every year millions of children undergo medical and dental procedures (Melamed & Siegel, 1984). In the hospital a child, who may have previously functioned adequately may become anxious in response to medical procedures so that normal coping behaviors are ineffective. Following a hospital stay, as many as one third of all children show some evidence of long-term psychological adjustment problems (Davies, Butler, & Goldstein, 1972). For some children, however, the hospital experience can be viewed in some respects as a positive one and approximately one quarter of all children are rated as behaviorally improved after hospitalization (Vernon, Foley & Schulman, 1967). While there is little information regarding factors that predict coping versus maladaptive behavior in the medical setting, there is reason to suspect that temperament characteristics may be of importance as temperament has been found to be a significant predictor of behaviors problems (Thomas & Chess, 1977). At present, however, the relationship of child temperament characteristics to children's adjustment to a hospital experience has yet to be researched. This study proposes to explore children's temperament, its relationship to

adjustment to a medical experience, and the extent to which this relationship is influenced by maternal behaviors exhibited in the medical setting.

Temperament

The concept of temperament dates to medieval times when it was used to refer to an individual's mental disposition, as constituted by the combination of the four cardinal humours (Rutter, 1982). Today, the general consensus is that temperament involves style rather than content; that is the how rather than the what or why of behavior (Plomin, 1982).

There has been, however, much confusion regarding the difference between the terms "temperament" and "personality." While Goldsmith and Campos (1981) state that there is no clear-cut distinction between temperament and personality, Allport (1937) has suggested that temperament includes those stylistic aspects of personality that are stable and are influenced by heredity. Kagan (1982) reflects the prevailing view of most temperament theorists stating that any quality which has persisted for more than two years is to be considered a temperament trait. In its current usage temperament is considered a ". . . rubric for a group of related traits and not a trait itself" (Goldsmith, Buss, Plomin, Rothbart, Thomas, Chess, Hinde and McCall, 1987 p. 506). The temperamental rubric encompasses phenomena such as irritability, activity level

and fearfulness. Goldsmith et al. (1987) outlines several general points of convergence among contemporary approaches to temperament. One is that temperamental dimensions reflect behavioral tendencies and may not correspond directly to discrete behavioral acts. Other points of convergence include emphases on biological underpinnings, continuity relative to other aspects of behavior, and consensus that temperament refers to individual differences rather than species general differences. Existing research literature, however, has not always clearly supported these positions and questions remain regarding both the constitutional basis and stability of temperament characteristics.

Temperament research in the United States began in the 1950s with the New York Longitudinal Study (NYLS) by Thomas, Chess and Birch (Thomas & Chess, 1977). The goals of the NYLS included (a) the development of a method for classifying behavioral individuality in early infancy in terms of objectively describable and reliably rated categories of temperament; (b) the study of consistencies and inconsistencies of these early characteristics in the course of development; (c) the analysis of the pertinence of early temperament to later psychological development; (d) the dynamic of temperament in the mastery of

environmental demands and expectations at meeting age appropriate tasks of development; (e) the identification of those children who develop behavior disorders, and the analysis of the etiology and course of these disorders in terms of a continuously evolving child-environment interactional process.

The first intensely studied group by Thomas, Chess and Birch was comprised of 141 children from 85 families. Sample collection was begun in 1956 when the children were from 2-3 months of age and completed in 1963. As of 1984, 133 children were still being followed by the researchers. These children and their parents were of middle- to upper-middle class background and most of the parents were born in the United States.

In 1961, a second longitudinal study was initiated by Thomas, Chess and Birch (1968). This study involved 95 children of working class Puerto Rican parents; of this sample 86% lived in low-income public housing projects. This study was begun so as to research a population of contrasting socio-economic background, as compared to the original group. Additionally, Thomas, Chess and Birch began longitudinally researching two samples of deviant children. One sample included 68 children born prematurely with low birth weights--approximately 40% of these children had clinical evidence of neurological impairment at age five years. This group was followed from birth. The

second group was comprised of 52 children with mildly retarded intellectual levels but without evidence of motor dysfunction or body stigmata. This group has been followed since when they were between 5- and 11-years-old. A special population of 243 children with congenital rubella was also studied in a cross-sectional experimental design at 2- to 4-years of age, and during a follow-up four years later.

For all of subjects the parents were the primary source of information on the child's behavior in infancy. As the child grew older, behavioral data were obtained through teacher interviews in nursery and elementary school, direct observations in the school setting and psychometric testing at ages 3, 6 and 9 and direct interview with each youngster and parent separately age 16-17 years. Academic achievement scores were gathered from school records. Additionally, whenever anyone in contact with the child suspected that there was a behavioral disturbance, a complete clinical evaluation was completed.

For each phase of data collection different individuals assessed each child. Thomas and Chess (1977) report that the intra- and interscorer reliability was at the 90% level of agreement.

The nine categories of temperament, their definitions and the three point scoring scales are as follows:

(1) Activity level is defined as the extent to which a motor component is present when a child is engaged in bathing, eating, playing, dressing, being handled, sleeping, reaching, crawling and walking (high, medium, low).

(2) Rhythmicity is defined as the predictability and/or unpredictability in time of any function. It can be analyzed in relation to the sleep-wake cycle, hunger, feeding patterns and elimination schedules (regular, variable, irregular).

(3) Approach or withdrawal is defined as the nature of the child's response to a new stimulus, whether it is a new food, toy or person (approach, variable, withdrawal).

(4) Adaptability is defined as the responses to a new or altered situation over time. In contrast to the approach-withdrawal dimension, the concern in this case is the ease with which the responses are modified in the desired directions (adaptive, variable, non-adaptive).

(5) Threshold of responsiveness is defined as the intensity level of stimulation necessary to evoke an observable response from the child (high, medium, low).

(6) Intensity of reaction is defined as the energy level of the response (positive, variable, negative)

(7) Quality of Mood is defined as the amount of pleasant, joyful, and friendly behavior as contrasted with

unpleasant, crying and unfriendly behavior (positive, variable, negative).

(8) Distractibility is defined as the extent to which the environmental stimuli changes an ongoing behavior (distractible, variable, non-distractible).

(9) Attention span and persistence concerns the length of time an activity is pursued by the child and the continuation of an activity in the face of obstacles (persistent, variable, non-persistent).

Qualitative and factor analyses of these nine dimensions by Thomas and Chess (1977) yielded three temperament constellations of functional significance: the most common pattern, the easy child, was seen in about 40% of the children. It is characterized by regularity, positive approach, high adaptability and mild or moderately intense mood which is mostly positive. An opposite pattern is seen in the difficult child. This child has been found to have an irregularity in biological functions, negative withdrawal responses to new stimuli, non- or slow-adaptability to change, and intense and negative mood. This pattern was found in approximately 10% of children. The third constellation has been termed the slow-to-warm-up child and was seen in 15% of the sample. These children were active, withdrawing, low in adaptability, tended to have a negative mood and a low intensity of reaction level.

Thomas, Chess and Birch (1968) found that 70% of children classified as "difficult" developed behavior problems, whereas only 18% of those children identified as "easy" developed such difficulties.

Graham, Rutter and George (1973) attempted to replicate the findings of the NYLS on a population of children all of whom who had a mentally ill parent. Subjects were obtained through an outpatient clinic of a London psychiatric facility. For an unspecified time period, all parents of children between the ages of 3.0 and 7.11 years who attended the clinic were included in this study. After an initial appointment to explain the purposes of the study, parents were interviewed both separately and together. Ratings were made at this time regarding the quality of the parental marriage and the amount of criticism expressed by the mother towards the child. Additionally, mothers were asked to complete a behavior questionnaire, on which a judgment of "psychiatric abnormality" was made, and a "temperamental characteristics" interview about the child. This interview regarding the child's temperament was divided into three sections. In the first section the mother was asked to describe the child's behavior over a wide range of routine situations including behavior at breakfast and while watching television. During the second section, the mother was asked for details of the child's regularity in areas such as sleep patterns, appetite and

bowel function. Finally the mother was questioned about the child's behavior in various non-routine situations. From this interview each child was rated on seven categories of behavior: mood, intensity of emotional expression, activity, regularity, malleability, fastidiousness, and approach/withdrawal to new people. Five of these categories including mood, intensity, activity, regularity and approach/withdrawal directly corresponded with Thomas, Chess and Birch's (1967) Parent Temperament Questionnaire. One year later the mother again completed the behavior questionnaire on her child.

Results indicated that those children judged as "psychiatrically abnormal" at the first administration of the behavior questionnaire were more likely to be intense in their emotional expression than those judged as psychiatrically normal. One year later, the psychiatrically abnormal children were found to have been characterized at the onset of the study as negative in mood and irregular in their biological functioning than those children judged as normal.

While these results support the hypothesis that temperament factors affect children's adjustment, several important issues are raised concerning this study. The first concerns the validity of the parental reports of the behavior and temperament of their children. Bates (1980) has questioned the validity of parent reports and has

suggested that "difficult temperament" is a parental perception. This may be especially relevant as one of the children's parents in this study was presumably psychiatrically ill. Additionally Graham et al. (1973) assume that temperament is a relatively constant trait. This has not been totally supported by the literature (Hooker, Nesselroade, Nesselroade & Lerner, 1987).

In a study which sought to identify antecedent characteristics of children that best predicted behavioral problems in young children, Bates, Maslin and Frankel (1985) found that a difficult temperament, as perceived by parents and secondary care givers, predicted behavior problems as measured by the Preschool Behavior Questionnaire. Specifically, those children with the difficult temperament traits of negative emotion, unadaptability/unsociability and high activity level were rated by their mothers as higher in anxiety, hostility and hyperactivity. These results, however, must be interpreted cautiously as they might be reflective of bias in mothers' report. Only one temperament dimension--unadaptability--was found to correlate significantly with one child behavior problem--anxiety. Furthermore, Bates et al. (1985) writes that correlations between difficult temperament, child and mother self-reported anxiety, defensiveness and social desirability, reflect that anxious mothers are more likely to have anxious children, and that

these children may express their proneness to anxiety via a difficult temperament.

Weber, Levitt and Clark (1986) investigated temperament and its affect on children's attachment to their mothers. Previous research has found that differences in children's temperament and qualitative differences in children's attachment are associated with different behavioral outcomes (Ainsworth, Blehar, Waters and Wall 1978). Temperament and attachment data were collected on 36 mother-child dyads. Temperament was assessed with the Dimensions of Temperament Survey (DOTS) (Lerner, Palermo, Spiro & Nesselroade, 1982) The dimensions of the DOTS are conceptually similar to those identified by Thomas and Chess (1977) except some of the Thomas and Chess categories were combined and the quality of mood dimension was eliminated. The DOTS dimensions include activity level, attention span, adaptability, rhythmicity, and reactivity. Attachment was assessed via the strange situation (Ainsworth et al., 1978). The strange situation is divided into eight 3 minute episodes. The situation begins with the mother and child alone in a room. A female stranger enters the room, sits quietly at first, then talks to the mother and attempts to play with the child. The mother then leaves the room leaving the child with the stranger. After 3 minutes, the mother returns and the stranger leaves. The mother settles her child if necessary and

encourages the child to play with toys. The mother exits again, leaving the child alone. After 3 minutes the stranger returns. In the final episode the stranger departs and mother and child are reunited. Based on the strange situation children were classified as avoidant, resistant or secure in their attachment relationship to their mother.

The results of this study indicated that child temperament showed little relation to behavior directed toward the mother but was related to behavior to the stranger. The dimension of temperament that showed the strongest association with strange situation behavior was adaptability. Children rated as more adaptable experienced less negative and more positive interactions with the stranger. Summary ratings of child difficult temperament, however, correlated with resistant behaviors towards both the mother and stranger. These results suggest that children's temperament characteristics do in fact contribute to their social development.

Although the literature has indicated an association between temperament and school performance (Carey, Fox & McDevitt, 1977; Thomas & Chess, 1977), the actual process variables through which variation in temperament has not been identified. Paget, Nagle and Martin (1984) investigated the relationships between child temperament characteristics and first-grade teacher-student interactions. Teachers of 105 first grade children

completed the Teacher Temperament Questionnaire (Thomas & Chess, 1977). This questionnaire is based on the Parent Temperament Questionnaire (Thomas & Chess, 1977) and contains seven sub-scales including (a) activity level, (b) adaptability, (c) approach-withdrawal, (d) sensory threshold, (e) intensity, (f) distractibility, and (g) persistence. Shortly after the questionnaires were completed, videotapes were made of classroom interactions. For each child a total of 5 hours of observation data was collected. These videotapes were rated by the Brophy and Good (1969) observation system. This observation system was teacher-student interactions rated as falling into one of three general categories: Response Opportunities, Child-Initiated Contacts, and Teacher-Initiated Contacts. A response opportunity occurred when a child publicly attempted to answer a question posed by the teacher, or when the child read aloud; child initiated contacts were of two types: work contacts occurred when a child asked a teacher for help with work and procedure contacts occurred when the child asked to engage in an activity such as sharpening a pencil, or asked what work he or she should begin to work on; teacher-initiated contacts were also of two types: work contacts in which the teacher helped a child with work without being asked, and behavior contacts which involved questions of discipline or classroom control

when the teacher commented on a child's nonacademic behavior.

Paget, Nagle and Martin (1984) found that children's temperament characteristics predicted teacher-student interactions. The findings suggested that the most adaptable and attentive children were the least likely to receive contact for their behavior, particularly contact involving praise. These results were explained in terms of a reinforcement cycle being in effect. That is, more praise is given to withdrawn children as they are more responsive to praise than more extroverted children.

Taken together this selective overview suggests that children's temperament characteristics influence their behavior in a variety of environments, and furthermore temperament characteristics may influence other individuals' responses.

Relationship of Parent Variables and Child Temperament

One factor affecting the child's psychological functioning within various environments may be the parent-child relationship including parent-child interaction characteristics. Webster-Stratton and Eyberg (1982) assessed 35 children between the ages of 3 and 5 years-old and their mothers on variables including child temperament, child behavior problems and mother-child interaction. Temperament was assessed by the Colorado Childhood Temperament Inventory (CCTI) (Rowe & Plomin, 1977). This is

a parental rating instrument for children 1 through 6 years of age. The CCTI was derived from the joint factor analyses of the Parent Temperament Questionnaire (Thomas et al., 1968) and Buss and Plomin's (1975) temperament questionnaire. Mothers also completed the Eyberg Child Behavior Inventory (ECBI) (Eyberg, 1980) on their children. This measure surveys a wide variety of parental concerns regarding child conduct problems. Finally, behavioral observations were obtained by videotaping each mother-child dyad for 30 minutes in a play room through a one-way mirror. The videotapes were then rated using the Interpersonal Behavior Construct Scale (IBCS) (Kogan & Gordon, 1975). Dimensions included on this scale are positive affect behavior, negative affect behavior, non-acceptance behavior, dominance, and submissiveness. Webster-Stratton and Eyberg's (1982) findings suggested that children with high levels of activity and low attention span tended to be negative, non-accepting, and noncompliant in their interactions with their mothers. Additionally, children described by their mothers as more social in temperament were judged as non-accepting in their interactions with their mothers. With regard to the interaction of the mother-child relationship with child temperament, mothers of highly active, low attention span children were observed to be more negative in affect, more non-accepting and more submissive with their children.

Furthermore, mother positive affect was found to be negatively correlated with child sociability.

Two observational studies examined the relationships of maternal characteristics and child temperament. Stevenson-Hinde and Simpson (1982) investigated the relationship between mother's mood and child temperament. Subjects included 26 boys and 21 girls from families composed of both parents and one sibling. Maternal mood was assessed by a self-report inventory developed by Snaith, Constantopoulous, Vardne and McGuffin (1982; cited in Stevenson-Hinde & Simpson, 1982) which provided summary ratings for depression, anxiety, inward irritability and outward irritability. Child temperament was assessed twice, once at 3 1/2 years of age, and again eight months later by the Temperamental Characteristics Interview. This structured interview was based on the interview schedule developed by Garside, Birch, and Scott (1982; cited in Stevenson-Hinde & Simpson, 1982). Dimensions assessed by the Temperamental Characteristics Interview included activity level, shyness, dependency, moodiness, intensity, malleability, irregularity, assertiveness and attention span. Stevenson-Hinde and Simpson (1982) found that the more temperamentally difficult the child (composed of the dimensions of moodiness, intensity, unmalleability, irregularity, assertive and decreased attention span) the more anxious and irritable (inwardly and outwardly) was the

mother. The findings of this study state the authors, raise the broader issue of how mothers influence and are influenced by children's characteristics.

Hinde, Easton, Meller and Tamplin (1982) studied the interaction of child temperament with maternal behavior. Data were collected from 21 girls and 24 boys at 42 (n=45) and 50 months of age (n=37). Children's temperament was assessed with the Temperamental Characteristics Interview (Garside et al., 1982 cited in Hinde et al., 1982), and maternal behavior was rated with an observational scale during an interaction with their children. Dimensions included on this observational scale included physical friendliness, verbal friendliness, expression of pleasure, types of speech, types of questions, types of controls, non-compliance, hospitality and excitement. Hinde et al. (1982) found that moody children, especially girls, were the recipients of maternal hostility and more physical responses and fewer verbally friendly responses.

In a study of infant temperament, maternal level of depression and child behavior problems, Wolkind and De Salis (1982) found that children assessed at 4 months of age as temperamentally difficult tended to have more behavior problems than other children when again assessed at 42 months of age. Additionally, the researchers found that maternal depression was positively associated with child behavior problems when the child was in the extreme

quartiles of either end of the dimensions of temperament, i.e., extremely easy or extremely difficult. Wolkind and De Sallis (1982) explain these somewhat curious results by stating that perhaps totally different mechanisms operate for these two groups of children. That is, at the "difficult" end there may be a group of children who are objectively difficult. These children could put stress on a mother and cause her to be depressed. On the opposite end of the spectrum there exists a group of "easy" children. It may well be the case that these children are truly easy, but their mothers may lack the capacity to cope with any stresses which arise.

In addition to investigating child temperament and the prediction of behavior problems, other studies have examined the interaction of child temperament, parental behavior and child behavior problems. Cameron (1977, 1978) utilized the data from the NYLS for his research. Parents were interviewed and completed the Parent Temperament Questionnaire on their child at various intervals during the child's life. Near the child's third birthday parents were also administered a focussed interview which included such topics as the degree of parent conflict and tension, the degree of warmth, protectiveness and permissiveness directed toward the child, and the degree and forms of discipline used. Cameron (1978) found that first year temperament scores predicted later child behavior problems.

Parental psychopathology was related to behavior problems in both male and female children; additionally, for male children, behavior problems were also related to negative temperament changes over time. Furthermore, these negative temperament changes were associated with parental intolerance, inconsistency and conflict (Cameron, 1977). This study suggests that while child behavior problems may be related to a difficult temperament, other variables including parent characteristics may affect children's behavioral adjustment.

Lee and Bates (1985) examined mother-child interaction as a possible mediating process between early child temperament and later behavior problems. Temperament was assessed on 111 children at the ages of 6, 13, and 24 months old via mother ratings on age appropriate forms of the Infants Characteristics Questionnaire. Additionally, each mother-child dyad was observed at home during two 2-3 hour observational periods several days apart. These observational periods were coded by observers, who continuously entered behavior codes on electronic event recorders. The behavior coding system used for the mother-child interaction sequences consisted of 65 descriptors of parent and child behaviors. The major categories of the codes included affection, maturity demands, communication, interpersonal control and child trouble behaviors. Child problem behavior was described in terms of conflict

sequence variables. Specifically the sequence variable consisted of a child trouble behavior, a mother control response and a child's response to the mother's control attempt.

Lee and Bates (1985) found that children perceived as difficult in temperament were more likely to have conflictual interactions with their mother than temperamentally easy children. The "difficult" child was observed to be more negative or resistant in response to mothers' control attempts and the mothers of such children were likely to use more intrusive control strategies including restraint of the child and a demand for maturity. Lee and Bates conclude that the data presented support the hypotheses that the quality of mother-child interaction can be considered a mediating process between a difficult temperament and later behavior disorders.

Goodness of Fit

Thomas and Chess (1977) state that "temperament is never considered by itself, but always in its relationship to, or in interaction with the individual's abilities, motives, external environmental stresses and opportunities" (p.1). Thus, temperament is to be considered within the context of the environment. This interactionist approach requires that information on an individual's behavior style be considered within the specific context in which it has occurred. That is, an individual's temperament cannot be

understood without a knowledge of the environmental situation within which the behavior was demonstrated. Additionally, a parent's response to a child and the parents' accompanying child-rearing characteristics cannot be assessed without a simultaneous consideration of the child's temperament and their influence on the parent.

From this interactionist approach to temperament, Thomas and Chess (1977) have used the concept of "goodness of fit" and "poorness of fit." The "goodness of fit" model postulates that favorable psychological adjustment and development will be possible if environmental demands and expectations are congruent with the individual's capacities, abilities, motivations and temperament. Similarly, if environmental demands and expectations are not congruent with an individual's capacities, abilities, motivations and temperament, a "poorness of fit" will exist and unfavorable psychological adjustment and development will be the results (Lerner, 1984).

The goodness of fit model is a contextual one which stresses that psycho-social functioning can best be predicted when one places the individual within a specific context. From this mode, neither adaptive psychological nor social functioning derive directly from either the individual's characteristics or the demands of the individual's environment. Goodness of fit is the extent to which an individual's characteristics are congruent with

the demands of the environment. Therefore, those individuals whose characteristics are not congruent with the environmental demands may have difficulties in adapting in that environment (Lerner, Lerner, Windle, & Hooker, 1985).

Temperament and Hospitalization

Children's responses to new places and procedures are strongly influenced by their temperament characteristics (Thomas and Chess, 1977). One situation which often includes new or unfamiliar surroundings and procedures is coming to the hospital, a situation that can be very stressful for some children (Melamed and Siegel, 1984). The stress of hospitalization for a child includes the distress of unfamiliar surroundings, the actual physical discomfort of surgery or recovery from illness and the loneliness precipitated by isolation from peers and school (Melamed, Robbins & Fernandez, 1982). Many children suffer behavior problems during the hospital stay. Not all children, however, are equally vulnerable to the effects of the hospital experience. Vernon et al. (1967) investigated the effects of hospital admissions and anesthesia induction on children between the ages of 2 and 6-years-old. They found that when the level of potential stress is low, as during the admission procedures to the hospital, differences in the children's responses are "primarily a matter of personality" (p.173). It is only those children

who are unusually sensitive to the situation who become upset. Most of the children are not upset. Furthermore, for some children, hospitalization may have a beneficial effect, as 25% of the children were rated by their mothers as behaviorally improved after a hospitalization experience (Vernon et al., 1967).

Thomas and Chess (1977) describe some of the ways children's temperament may influence their responses to physical symptoms, the physician and the medical setting. For example, the child who is brought to a medical setting is confronted with an unfamiliar place, a number of unfamiliar persons, unusual sounds and is subjected to a physical examination and procedures which may be discomfoting and sometimes painful. Thomas and Chess (1977) write that depending on the child's temperament, the child may fuss quietly and briefly squirm a bit and then be immediately cheerful once the procedures are completed. Or the child may howl loudly from the moment he or she enters the physicians' office, struggle violently during the physical examination and inoculation, take up to several hours to subside, and then start up again with even more intensity at the next visit. The child with the low activity level will sit quietly in the waiting room. The high activity youngsters, by contrast, will fidget, jump around, try to poke into drawers and closer and make a

nuisance of themselves, if they have to wait a long time before the doctor sees them.

The purpose of this study was to investigate children's adjustment to a surgical experience and how it is related to temperament factors. Additionally, the mediational effect that maternal characteristics have on children's behavioral adjustment to the surgical experience was investigated. The literature has indicated the importance of temperament in influencing children's reactions to different stressors; however, individual differences in children's adjustment to a surgical experience as prompted by temperament factors had yet to be investigated. Additionally, children's temperament was to be considered in relationship to the parent and could not be assessed without the simultaneous consideration of the parent's response to the child.

Predictions

Predictions regarding children's temperament, their behavioral adjustment to the surgical experience and the mediational effect that parent-child interaction had on children's behaviors in the hospital were as follows:

- (1) Children with a "Difficult" temperament make up would more frequently display the behaviors of "Distress" and "Exploration" as measured by the Dyadic Prestressor Interaction Scale during a pre-operative visit to the clinic, as compared to children with an "Easy" temperament.

(2) Children's behavioral adjustment to anesthesia induction would vary depending on the child's temperament.

That is, difficult temperament children would display more problematic behaviors and would be rated by observers and anesthesiologists as less cooperative during anesthesia induction than those children with an easy temperament.

(a) Specifically, children who tended to have negative withdrawal responses to new stimuli and/or non- or slow adaptability to change would be rated by observers and anesthesiologists as displaying more disruptive behaviors and less cooperative during anesthesia induction as compared to those children who tended to approach new stimuli and/or tended to adapt to change.

(3) Children whose parents used distraction, reassurance, and information provision during the pre-operative visit to the clinic would display fewer distress behaviors and be rated by observers and anesthesiologists as more cooperative during anesthesia induction as compared to those children whose parents demonstrated ignoring, agitation and restraint during the pre-operative visit.

(4) Children's behavioral adjustment to the surgical experience would be mediated by parent characteristics assessed during parent-child interaction characteristics. Those children with a "Difficult" temperament and whose parents demonstrated agitation, restraint, or ignoring during the pre-operative clinic visit would have higher

heart rate levels and would be rated by observers and anesthesiologists as displaying more distress behaviors and less cooperative behavior during anesthesia induction than children with an "easy" temperament and whose parents demonstrated distraction, reassurance, or information provision during the pre-operative clinic visit.

CHAPTER II METHODS

Subjects

Sixty children between the ages of 4- and 10-years-old being seen at the Ear, Nose, Throat Outpatient Clinic at Shands Teaching Hospital, J. Hillis Miller Health Center, Gainesville, Florida for a scheduled preoperative evaluation along with their mothers served as subjects. Shands is a tertiary care hospital, and clinic patients are usually referred from local pediatricians or general practitioners. Children included in the study were admitted for surgery usually one to two days following their visit to the Ear, Nose, Throat Clinic. All subjects in this study had elective surgery. Additional characteristics of the sample will be discussed in some detail in the Results section.

Measures

Background Information Interview Form (BIIF) (Appendix A)

This questionnaire provided data on factors that may influence the child and parent's behavior in the medical situation. Information obtained from this short, structured interview form included age, sex and race of the child. Brain and McClay (1968) found age to be an

influencing factor with regard to the child's response to medical procedures. The parents also used a four-point scale to indicate how their child had reacted to previous medical experiences and how well they expected their child to react to the hospitalization experience. Research has demonstrated the importance of taking into consideration the child's previous experiences (Melamed, Meyer, Gee & Soule, 1976). Therefore, the experimental interviewer ascertained the subjects' previous surgical experience.

Parent Temperament Questionnaire (PTQ)

The PTQ is a 72 item questionnaire developed by Thomas and Chess (1977). The questions relate to a range of child behaviors reflective of the nine temperament dimensions discussed earlier with eight items pertaining to each dimension. The parent is asked to rate each item on a seven point scale (1=hardly ever occurs; 7=almost always occurs). A mean score ranging from one to seven is determined for each dimension. Five of these dimensions of temperament including Mood, Adaptation, Approach/Withdrawal, Intensity and Biological Rhythmicity are used to calculate a child's standing on a continuous scale of difficult-easy temperament.

Difficult temperament children were defined using Thomas and Chess's (1982) specifications, i.e. negative mood, slow adaptability to change, tendency to withdraw

from new situations, tendencies towards intense expressiveness and irregularity of biological functions.

Katz-Newman and Johnson (1986) reported that both the overall temperament score and the individual sub-scale scores obtained on the Parent Temperament Questionnaire showed adequate test-retest reliability over a two-week period. Reliability for the overall score was .78. With regard to the scales which comprised the "Easy"/"Difficult" continuum Katz-Newman and Johnson (1986) reported the following reliability coefficients: adaptability .73, approach/withdrawal .92, intensity .64, mood .80, and biological rhythmicity .64. Regarding the validity of the measure, it can be noted that there is evidence from a number of studies to indicate significant relationships between ratings of difficult temperament via this measure and later behavioral difficulties (Graham, Rutter & George, 1973; Maurer, Cadoret & Cain, 1980; Rutter, Birch, Thomas & Chess, 1964; Thomas et al., 1968).

Dyadic Prestressor Interaction Scale (DPIS)

The DPIS was used to rate videotaped mother-child interactions in the examination room prior to the beginning of the physical examination. Observers rated the tapes using the instantaneous scan method (Altmann, 1974) every five seconds, to determine whether a behavior was occurring at that moment.

This DPIS was constructed on the basis of related literature and extensive narrative descriptive clinic observations (Bush, 1982). The child categories on this scale were chosen because of their theoretical relevance to the attachment literature (Bretherton & Ainsworth, 1974) and because recent studies (Arend, Gove, & Sroufe, 1979; Sroufe, Fox, & Pancake, 1983) suggest that a continuity of the quality of early mother-child interactions exists with regard to older children's competence in problem solving. The parent categories on the DPIS were selected based on the empirical literature on parents' child management styles as they relate to children's fear development and independence (Bush, Melamed, Sheras & Greenbaum, 1986). This scale consisted of four classes of functionally similar child behaviors and six parent behaviors.

Within each class four specific behaviors were defined. The child categories included attachment, distress, exploration and social behavior. The parent categories corresponded to dimensions of parent behavior which previous research had found to be related to the child's adjustment in the medical setting. The categories included information provision, reassurance, ignoring, distraction, agitation and restraint. Bush et al. (1986) established the reliability for the DPIS in a stressful medical situation. Inter-observer reliability for eight of the ten behavior categories was above .90 with only distress (.77)

and restraint (.60) falling outside of this range. The results of the Abeles (1984) study, which showed that those parents who demonstrated informing in response to child attachment had children who were less distressed in the medical setting, support the importance of looking at observational data on specific interactions between parents and their children, as measured by the DPIS, in predicting children's reactions to medical procedures.

For the purposes of the present investigation, inter-rater reliability of the DPIS was assessed by comparing the ratings made by two independent observers. In order to estimate the reliability of these ratings, a Pearson correlation coefficient was calculated for each DPIS behavior for half (30 subjects) of the sample.

Operating Room Behavior Rating Scale--Revised (ORBRS-R)
(Appendix B)

This scale was developed by Lumley and Melamed (1986) and was adapted from Meyer and Muravchick's (1977) measure of the extent of cooperation with anesthesia induction procedures. It consists of a checklist of disruptive behaviors and a seven point cooperation scale (1=total uncooperation; 7=total cooperation) across the three phases of anesthesia induction. Phase one consisted of that time period from the child's separation from the mother and entry into the operating room until the child was transferred to the operating room table; phase two included that time from when the child was transferred to the

operating room table until the mask or needle was viewed by the child; and phase three included that time from when the child viewed the mask or needle, until complete anesthesia induction.

At the completion of anesthesia induction, anesthesiologists were asked to rate children's level of cooperation on a seven point scale (1=total uncooperation; 7=total cooperation).

In the present study inter-rater reliability of ORBRS-R was assessed by the ratings made by two independent observers. In order to estimate the reliability of these ratings, a Pearson correlation coefficient was calculated for approximately 20% of the sample.

Heart Rate

Children's heart rate levels were recorded during phases two and three of anesthesia induction. Heart rate data were considered relevant to this study, as accelerations in heart rate have been found to be significantly associated with increased levels of fear (Andreassi, 1980). After the child was placed on the operating room table (phase 2), electrodes were attached to the child which electronically monitored his or her heart rate. Observers manually recorded initial heart rate and changes in heart rate during the anesthesia induction process. Due to the varied number of recordings during each phase of anesthesia induction, mean heart rate levels

were computed for each phase. This was completed by averaging the first, middle and final recording within each phase of anesthesia induction..

Procedure

Subjects were initially approached in the clinic's general waiting area by one of the experimenters. The mothers and their children were asked to participate in a study seeking to investigate how people handle coming to the hospital. Informed consent was obtained from all subjects. Approximately 95% of the mothers asked to participate in this study agreed to do so.

At this time mothers were interviewed using the structured format provided by the Background Information Interview Form (BIIF) and completed the Parent Temperament Questionnaire (PTQ). After this interview, children and their mothers were sent to laboratory for a venipuncture as part of the routine preoperative evaluation. After returning from the laboratory, the child and the parent were escorted to a clinic examination room where they were to see a physician for the preoperative examination. A videotape recording was made of the waiting period before the doctor entered the examination room. These videotapes were rated by observers using the Dyadic Prestressor Interaction Scale (DPIS).

On the day of surgery, an observer met the child and parent in the preoperative waiting room. After a time

period varying from 10 minutes to 1 hour the child was taken to the operating room by the anesthesiologist. While the child was in the operating room the mother usually waited to be called by hospital staff in one of several waiting rooms. The observer used the Operating Room Behavior Rating Scale--Revised (ORBRS--R) to rate the number of distress behaviors and level of cooperation during the various phases of the anesthesia induction procedure. Children's heart rate was recorded as soon as the electrodes were attached. After anesthesia induction was completed, anesthesiologists were asked to rate the children's level of cooperation with the induction procedure.

In order to address the major hypotheses of the study several approaches to data analyses were taken. Initial analyses involved computing means and standard deviations for all measures used in this study. This was followed by multiple regression analyses designed to examine both the direct and interaction relationships between temperament, parenting behaviors, and children's responses to anesthesia induction as well as the combined effects of temperament and parent variables.

CHAPTER III RESULTS

This section will be organized as follows: first, demographic information will be presented; then preliminary data on measures will be presented; finally, data regarding tests of hypotheses will be considered.

Demographic and Questionnaire Measures

Table 3-1 presents the demographic characteristics of the sample of 60 mother-child dyads used in the data analyses. As can be seen the sample was reasonably balanced with respect to both age and sex. More than one half (55%) of the children had some type of previous surgical experience involving general anesthesia.

Means and standard deviations for subjects on all questionnaire measures are presented in Appendix C. On the Parent Temperament Questionnaire (PTQ) mothers used a seven point scale to rate their children across nine dimensions of temperament. As a group, the subjects were rated as having an overall moderate temperament ($M=4.77$, $SD=.57$, range=3.43-6.01). With regard to the specific dimensions of temperament, mothers rated their children as having a moderately positive mood ($M=5.06$, $SD=.89$, range=1.88-6.63) and moderate levels of adaptability ($M=5.16$, $SD=.96$, range=1.75-6.88). Mothers also rated their children as

Table 3-1
Demographic Characteristics

Age - years	4	5	6	7	8	9	10
N	7	11	12	10	8	11	1

	Males (N)	Females (N)
Sex	36	24

(N)	Experience (N)	No Experience
Previous Surgical Experience	33	27

	Laser of Papilloma (N)	Removal or Insertion of Tubes (N)	Tonsillectomy and/or Adenoidectomy (N)	Other (N)
Surgical Procedure	4	27	14	15

being about moderate in terms of biological rhythmicity ($M=4.58$, $SD=.94$, range=2.50-7.50), tendency to approach new stimuli ($M=4.60$, $SD=1.13$, range=1.38-6.71) and low to moderate in intensity of reactions ($M=3.70$, $SD=1.00$, range=1.88-5.88).

The DPIS was used to rate videotaped mother-child interactions. A time-date generator was used to superimpose an elapsed-time digital clock onto the tapes without obscuring the visibility of subjects. Observers then used this clock to make instantaneous scan ratings (Altmann, 1974) of the 10 DPIS categories every 5 seconds. Every 5 seconds, observers rated whether each of the 10 behavior classes was being engaged in at that moment. The 5-second interval was chosen as it has been used successfully in previous studies (Bush, Melamed, Sheras, & Greenbaum, 1986; Abeles, 1984) and because this interval minimized the frequency of scorable behaviors occurring but not being scored due to onset and offset between scanpoints. It is important to realize that each parent behavior and each child behavior are rated independently; therefore collectively, the DPIS behaviors will not sum to 100%.

During the waiting period before the physician entered the examination room, children were observed engaged in social behaviors 51.33% of the time (range=0-100). Attachment behaviors were the next most frequently

occurring at 36.02% of the time (range=1.8-100). Children engaged in exploration 25.84% of the time (range=0-100) and exhibited distress 19.11% (range=0-90.6) of the time.

Among the parent behaviors, distraction was the most frequently occurring at 40.02% of the time (range=0-100). Information provision was the next most frequently occurring behavior at 21.08% of the time (range=0-97.30) followed by reassurance at 14.97% (range=0-100). Mothers were observed ignoring their children at an average of 13.27% of the time (range=0-75.60). Maternal agitation was observed 7.68% of the time (range=0-60.00). Restraint was the least frequently observed behavior occurring at 3.70% of the time (range=0-33.90). These findings are similar to those found by Bush et al. (1986).

Videotaped recordings of the mother-child interactions ranged in length from 5 to 10 minutes. Correlational analyses of the relationship of length of recording to percent of each behavior displayed revealed that a higher percentage of child attachment behaviors were displayed when the recording period was shorter ($r = -.27$, $p < .04$), and a higher percentage of maternal ignoring behaviors were displayed when the recording period was longer ($r = .39$, $p < .003$). No significant relationships were found between the other DPIS behaviors and the length of the videotape recording.

On the Operating Room Behavior Rating Scale-Revised (ORBRs-R) the mean number of distress behaviors displayed by children during entry into the operating room until transfer to the operating room table (phase 1) was .66 (range=0-5, SD=1.09). Cooperation during this phase was rated at a mean level of 6.05 (1=total uncooperation, 7=total cooperation) (range=1-7, SD=1.42). From the time the child was transferred to the operating table until the child viewed the mask or needle (phase 2) children exhibited an average of 1.68 distress behaviors (range=0-6, SD=1.5). The mean level of cooperation during phase 2 was rated as 6.00 (range=2-7, SD=1.31). In the final phase of anesthesia induction (phase 3--view of the mask or needle until complete anesthesia induction) children displayed an average of 2.22 distress behaviors (range=0-9, SD=2.39) and were rated as having a mean cooperation level of 5.22 (range=1-7, SD=2.05). Anesthesiologists rated 44 children as having a mean cooperation level of 5.55 (range=1-7, SD=2.02) during the complete course of induction.

Reliability of Observational Measures

DPIS. Interobserver reliability of the DPIS was evaluated by comparing the percentages of behaviors rated as being present by two independent observers. DPIS ratings were made by two raters on 50% of the dyads, Pearson product moment correlations were obtained for the DPIS and are presented in Table 3-2. A correlation

Table 3-2
DPIS Inter-Rater Reliability
Pearson Product Coefficients

Attachment	.94
Distress	.66
Exploration	.75
Social	.94
Ignoring	.98
Reassuring	.52
Distraction	.83
Restraint	.50
Informing	.74
Agitation	.89

coefficient was computed for each DPIS category. These coefficients provided estimates of the reliability of the DPIS total frequency scores within each DPIS category.

The DPIS was found to have adequate to high reliability for observational measurement of mother-child interactions. Good concordance was found for all categories except distress, reassurance and restraint. Bush et al. (1986) attributes the low reliability coefficient for restraint to be due to the observed incidence and short duration of restraining behaviors during videotaping.

ORBRs-R. Interobserver reliability of the ORBRs-R was evaluated by comparing the number of distress behaviors and level of cooperation as rated by two independent observers. Pearson product moment correlations were obtained for the ORBRs-R and are presented in Table 3-3. The distress behavior scores and cooperation ratings showed adequate interobserver reliability for all phases of anesthesia induction.

DPIS Intercorrelations

Intercorrelations among parent behaviors. Correlation coefficients between parent behaviors are presented in Table 3-4. Parental ignoring was significantly related to distracting, informing, and agitation. Ignoring is defined so as to be the only behavior on the DPIS not able to co-occur in any one interval with parental reassurance, distraction, restraint or informing; however, ignoring can

Table 3-3
ORBRS-R Inter-Rater Reliability
Pearson Product Coefficients

Phase 1 Distress Behaviors	1.00
Phase 1 Cooperation Level	.73
Phase 2 Distress Behaviors	.80
Phase 2 Cooperation Level	.73
Phase 3 Distress Behaviors	.98
Phase 3 Cooperation Level	.72

Table 3-4
Intercorrelations Among DPIS Parent Behavior Categories

	Ignore	Reassure	Distract	Restrain	Inform
Ignore					
Reassure	-.05				
Distract	-.41*	-.05			
Restrain	-.03	-.01	-.11		
Inform	-.37*	-.01	-.46**	.00	
Agitation	.39*	.01	-.24	.00	-.11

* $p < .005$

** $p < .0005$

co-occur with agitation. Consistent with the operational definitions of behaviors included on the DPIS, ignoring was found to be inversely correlated with distraction and informing, and positively related to parental agitation. Parental distraction was found to be inversely correlated with parental informing. This finding is reflective of the definitions of distraction and informing. Distraction is defined as engaging in play or conversation which is unrelated to medicine, and informing is defined as the parent giving information, exploring and answering questions which are medically relevant. These findings are consistent with previous research findings (Bush, et al. 1986; Abeles, 1984).

Intercorrelations among child behaviors. Correlation coefficients between child behaviors are presented in Table 3-5. In general, child behaviors were related to one another. Social/affiliative behavior was found to be inversely correlated with attachment, distress and exploratory behaviors. Child attachment was positively correlated with distress behavior. These results while not discrepant with previous findings are somewhat different in that Bush et al. (1986) report no relationships between social/affiliative behavior and the other child behavior categories.

Table 3-5
Intercorrelations Among DPIS Child Behavior Categories

	Attachment	Distress	Exploration
Attachment			
Distress	.33*		
Exploration	.16	.08	
Social	-.31**	-.59***	-.72***

*p < .01

**p < .05

***p < .0001

ORBRs-R and Heart Rate Intercorrelations

Correlation coefficients between child distress behaviors, ratings of cooperation and heart rate are presented in Table 3-6. Amount of distress behavior was related to ratings of cooperation and to children's heart rate. Children who demonstrated many distress behaviors were rated as less cooperative by observers and their anesthesiologists across the three phases of anesthesia induction. Ratings of cooperation by independent observers and anesthesiologists were strongly positively correlated especially in the third phase of anesthesia induction. Analyses of physiological data indicated a positive relationship between children's heart rate across phases of anesthesia induction. Additionally, children who had a high heart rate during the final phase of induction tended to display more distress behaviors and were rated as less cooperative by observers and anesthesiologists.

Tests of Hypotheses

Initial analyses were conducted to examine the relationships between children's temperament characteristics and their behavior as assessed by the DPIS during the pre-operative visit to the clinic. No significant relationship was found between children's status on the overall composite measure of easy-difficult temperament and their distress during the pre-operative visit. When separate dimensions of temperament were

Table 3-6
Intercorrelations Among ORBRS-R Ratings

	DST1	COOP1	DST2	COOP2	HR2	DST3	COOP3	HR3
DST1 ^a								
COOP1 ^b	-.49 [*]							
DST2 ^c	.36 [*]	-.37 [*]						
COOP2 ^d	-.32 ^{**}	.86 [*]	-.53 [*]					
HR2 ^e	.24	-.26	.16	-.14				
DST3 ^f	.22	-.11	.37 [*]	-.31 [*]	.11			
COOP3 ^g	-.16	.47 [*]	-.39 [*]	.68 [*]	-.08	-.75 [*]		
HR3 ^h	.09	-.07	.16	-.27	.63 [*]	.42 [*]	-.48 [*]	
ANES ⁱ	-.03	.36 ^{**}	-.32 ^{**}	.62 [*]	-.14	-.71 [*]	.87 [*]	-.43 [*]

^adistress behaviors phase 1
^bcooperation ratings phase 1
^cdistress behaviors phase 2
^dcooperation ratings phase 2
^eheart rate levels phase 2
^fdistress behaviors phase 3
^gcooperation ratings phase 3
^hheart rate levels phase 3
ⁱanesthesiologist ratings

^{*}p<.01
^{**}p<.05

considered, contrary to predictions, children's tendency to approach new stimuli was associated with higher rates of distress behavior during the clinic visit ($r=.27$, $p<.03$) No significant relationships between any of the other dimensions of temperament and children's behavior in the clinic were obtained.

Relationships Between Temperament, Maternal Characteristics and Children's Behavior During Anesthesia Induction

Multiple regression analyses were completed in order to examine any main and interaction effects between children's temperament, maternal specific characteristics as assessed by the DPIS, and children's behavior during the three phases of anesthesia induction. Because previous experience with medical procedures and the age of the child have been found to be influencing factors with regard to children's responses' to medical procedures (Melamed, Meyer, Gee and Soule, 1976; Brain and McClay, 1968), the multiple regression analyses also included these variables. The overall easy-difficult temperament score comprised of the five sub-scales of temperament, (mood, adaptability, approach/withdrawal, biological rhythmicity and intensity) and the individual sub-scale scores of approach/withdrawal and adaptability were used in these analyses. DPIS parenting variables were entered separately in each of the analyses. Results of those analyses yielded a number of

significant findings and are presented in the following sections.

Phase 1 of Anesthesia Induction

Direct relationships between children's temperament and outcome measures

Multiple regression analyses of phase 1 data revealed no significant findings regarding the overall temperament score or adaptability sub-scale score. Significant findings, however, were obtained when the approach/withdrawal temperament dimension was used in the equation.

Influence of child temperament on children's distress levels. The multiple regression model which included the variables of age, previous experience, children's tendency to approach or withdraw from new stimuli, maternal information provision, and an interaction of approach/withdrawal and information provision as predicting the number of distress behaviors displayed by children upon entry into the operating room, was significant [$F(5,49) = 2.40, p < .05$]. Together these variables achieved a multiple R of .44 accounting for approximately 20% of the variance. When controlling for the other variables entered into the equation, children's tendency to approach new stimuli was negatively associated with the number of distress behaviors displayed ($F=4.33, p < .04$). Children who were described by

their mothers as withdrawing from new stimuli tended to display more distress behaviors.

No significant findings were obtained regarding the interaction of approach withdrawal and maternal information provision in predicting the number of distress behaviors displayed by children during the first phase of anesthesia induction.

Influence of child temperament upon children's cooperation levels. The multiple regression model which included the variables of children's tendency to approach or withdraw from new stimuli, maternal information provision and an interaction of approach/withdrawal and information as predicting children's cooperation levels during the first phase of anesthesia induction was significant [$F(3,51) = 3.13, p < .03$]. Together these variables achieved a multiple R of .39 which accounted for approximately 15% of the variance. When controlling for the other variables entered into the equation, children's tendency to withdraw from new stimuli was positively associated with ratings of cooperation ($F=6.29, p < .02$). Children who were rated as withdrawing from new stimuli were rated as less cooperative by observers during the first phase of anesthesia induction.

No significant findings were obtained regarding the interaction of approach/withdrawal and information

provision as predicting children's cooperation levels during the first phase of anesthesia induction.

Direct relationships between maternal behaviors and outcome measures

Multiple regression analyses revealed no significant main effect findings regarding maternal ignoring, reassurance, restraint, information provision or agitation. Significant findings were obtained, however, when maternal distraction was used in the equation.

The multiple regression model which included the variables of age, previous experience, children's tendency to approach or withdraw from new stimuli, maternal rates of distraction and the interaction of approach/withdrawal and distraction as predicting the number of distress behaviors displayed by children during the first phase of anesthesia induction was significant [$F(5,49)=4.09, p<.004$]. Together these variables achieved a multiple R of .54 accounting for approximately 29% of the variance. When the other variables in the equation were controlled for, maternal distraction was positively associated with the number of distress behaviors [$F=8.65, p<.005$]. High levels of maternal distraction were associated with a high number of distress behaviors during the first phase of anesthesia induction. Additionally, the interaction of the temperament characteristic approach/withdrawal and maternal distraction was a significant predictor of distress

behaviors ($F=5.88$, $p<.02$). Figure 3-1 demonstrates the nature of the interaction. Children who tended to withdraw from new stimuli and whose mothers provided distraction at low levels displayed fewer distress behaviors during phase 1 of anesthesia induction than did those withdrawing children whose mothers provided distraction at higher levels. Children who tended to approach new stimuli, however, appeared not to be affected by different levels of parental distraction. Overall, temperamentally withdrawing children of parents who provided high levels of distraction displayed the most number of distress behaviors, while children who tended to approach new stimuli were unaffected by different levels of parental distraction during phase 1 of anesthesia induction.

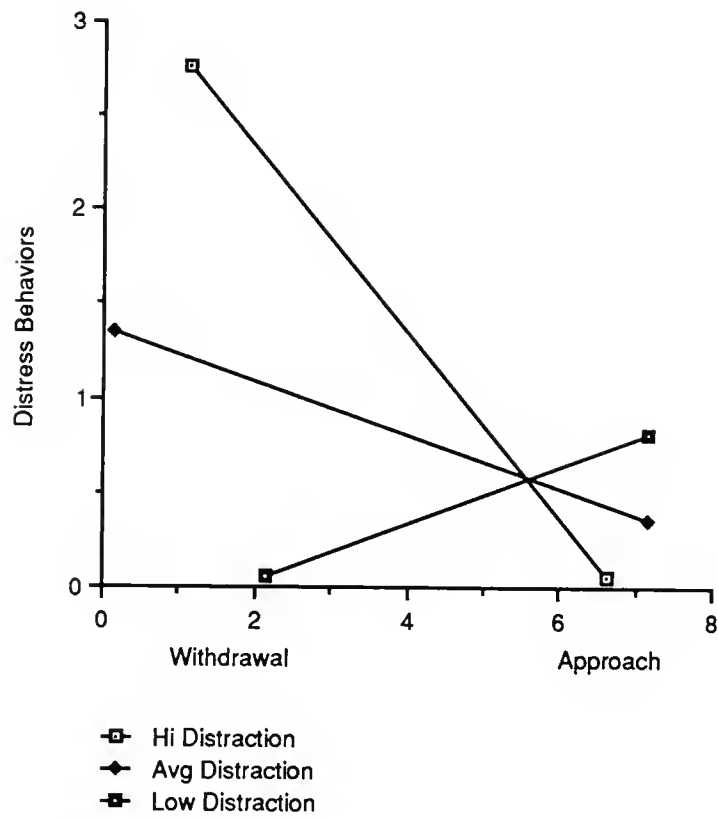
Phase 2 of Anesthesia Induction

Multiple regression analyses revealed no significant findings regarding temperament or maternal behaviors as predicting children's distress behavior, cooperation ratings or heart rate levels during the second phase of anesthesia induction.

Phase 3 of Anesthesia Induction

Direct relationships between children's temperament and outcome measures

Multiple regression analyses revealed no significant findings regarding the overall temperament score, approach/withdrawal or adaptability sub-scale scores as



Regression Lines Indicating the Relationship Between Children's Tendency Towards Approach/Withdrawal and Maternal Use of Distraction as Predicting Number of Distress Behaviors.

Figure 3-1

predicting children's distress behaviors, cooperation ratings or heart rate levels during the third phase of anesthesia induction.

Relationships between maternal behavior and outcome measures

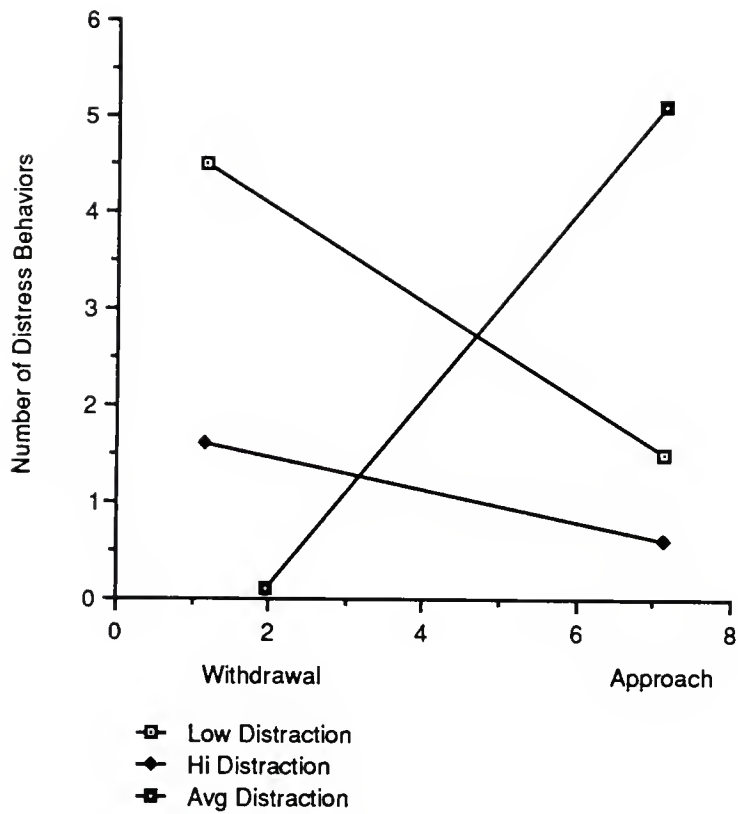
Multiple regression analyses of phase 3 anesthesia induction data revealed no significant findings regarding the DPIS parent category of information provision. Significant findings were obtained however, when the parent behaviors of distraction, ignoring, reassurance, agitation and restraint were entered into the models.

Influence of maternal distraction on children's distress levels. The multiple regression model which included the variables of age, previous experience, the approach/withdrawal temperament dimension, maternal use of distraction and an interaction of approach/withdrawal and distraction as predicting the number of distress behaviors displayed by children during the third phase of anesthesia induction was significant [$F(5,52)=2.39, p<.05$]. Together these variables achieved a multiple R of .43 accounting for approximately 19% of the variance. Controlling for the other variables entered into the equation, maternal distraction was negatively associated with the number of distress behaviors displayed by children ($F=5.70, p<.02$). Less use of maternal distraction was associated with an increased number of distress behaviors displayed by

children during the third phase of anesthesia induction. Additionally, the interaction term of approach/withdrawal and maternal distraction was a significant predictor of children's distress behaviors ($F=5.42$, $p<.02$). As shown in Figure 3-2, children who tended to withdraw from new stimuli and whose mothers provided high rates of distraction demonstrated fewer number of distress behaviors than did the withdrawing child whose mother provided little distraction. Average and low rates of maternal distraction with the child who tended to approach new stimuli were associated with a lowered number of distress behaviors, as compared to the approaching child whose mother provided high levels of distraction. Overall, withdrawing children who had highly distracting mothers displayed the fewest number of distress behaviors, while those children who tended to approach stimuli and who had highly distracting mothers displayed the highest number of distress behaviors.

Influence of maternal and child variables on heart rate levels

Maternal ignoring and child temperament. The multiple regression model which included the variables of age, previous experience, overall temperament, maternal ignoring and an interaction of temperament and ignoring variables as predicting children's heart rate levels during the third phase of anesthesia induction was significant [$F(5,40)=3.19$, $p<.02$]. Together these variables achieved a

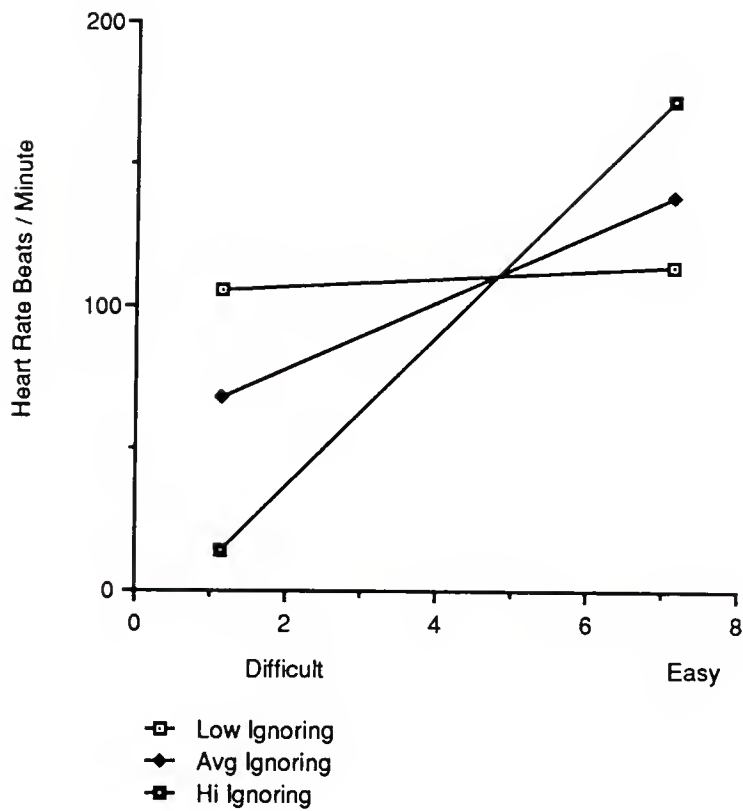


Regression Lines Indicating the Relationship Between Children's Tendency Towards Approach/Withdrawal and Maternal Use of Distraction as Predicting Number of Distress Behaviors.

Figure 3-2

multiple R of .53 accounting for approximately 28% of the variance. Maternal ignoring, when controlling for the other variables entered into the equation, was negatively associated with heart rate levels ($F=6.29$, $p<.02$). That is, more ignoring was associated with lower heart rates. Additionally, the interaction of maternal ignoring with child temperament was significant ($F=6.58$, $p<.01$). As shown on Figure 3-3, difficult temperament children whose mothers showed a high degree of ignoring had lower heart rates than did those difficult children whose mothers did not ignore them. Easy temperament children whose mothers did not ignore them had lower heart rates than those children with easy temperaments whose mothers who ignored them at high rates. Overall temperamentally difficult children whose mothers ignored them at high levels had the lowest heart rates, while temperamentally easy children whose parents ignored them at high rates had the highest heart rates.

Similar findings emerged when the temperament variable approach/withdrawal was entered into the equation. The multiple regression equation which included the variables of age, previous experience, the approach/withdrawal temperament characteristic, maternal ignoring and the interaction of approach/withdrawal and ignoring as predicting children's heart rate levels was significant [$F(5,40)=2.92$, $p<.02$]. Together these variables achieved a

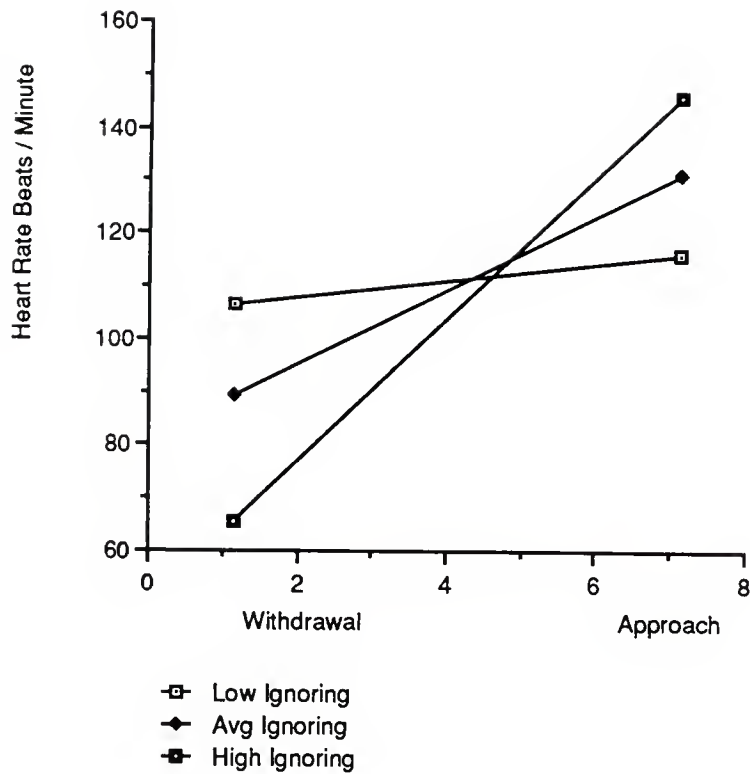


Regression Lines Indicating the Relationship Between Children's Temperament and Maternal Ignoring as Predicting Heart Rate Levels.

Figure 3-3

multiple R of .52 accounting for approximately 27% of the variance. Maternal ignoring, when controlling for the other variables entered into equation, was negatively associated with heart rate levels ($F=4.14$, $p<.05$). That is, lowered rates of maternal ignoring were associated with higher heart rates. Additionally, the interaction of the approach/withdrawal temperament characteristic and maternal ignoring was a significant predictor of heart rate levels ($F=4.58$, $p<.04$). Figure 3-4 demonstrates the relationship between heart rate levels and approach/withdrawal characteristics at different levels of maternal ignoring. Withdrawing children whose mothers ignored them at high rates had lower heart rates than did those withdrawing children whose mothers did not tend to ignore them. Those children who tended to approach new stimuli and whose mothers did not ignore them tended to have lower heart rates than those withdrawing children whose mothers ignored them at high rates. Overall, those children who tended to withdraw from new stimuli and whose mothers tended to ignore them at high rates had the lowest heart rates, while those children who tended to approach new stimuli and whose mothers tended to ignore at high rates had the highest heart rates.

Maternal reassurance and child temperament. The multiple regression model which the variables of age, previous experience, overall temperament, maternal

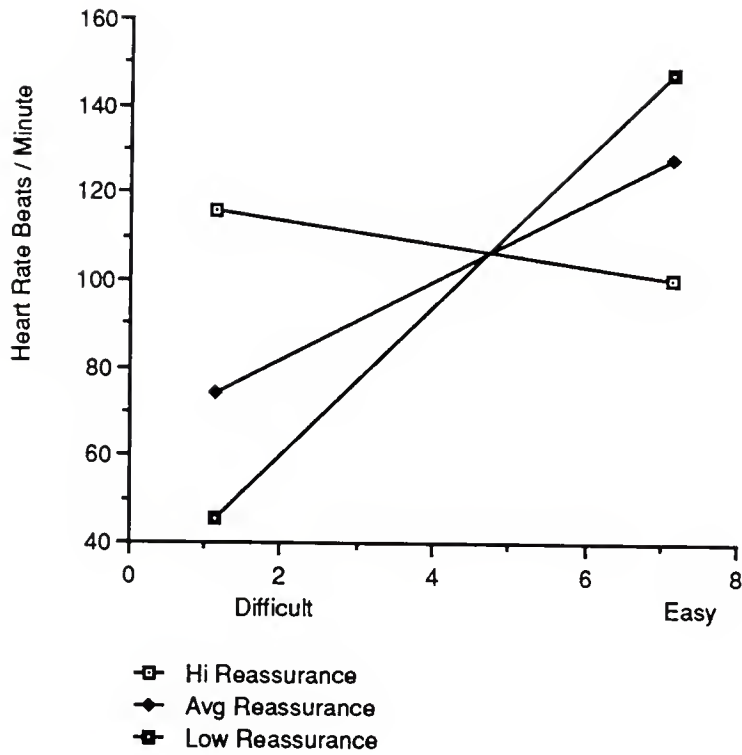


Regression Lines Indicating the Relationship Between Children's tendency Towards Approach/Withdrawal and Maternal Ignoring as Predicting Heart Rate Levels.

Figure 3-4

reassurance and the interaction variable of temperament and reassurance as predicting children's heart rate levels was significant [$F(5,40)=3.16, p<.02$]. Together these variables achieved a multiple R of .53 accounting for approximately 28% of the variance. When the other variables in the equation were controlled for, reassurance was positively associated with heart rate levels ($F=4.98, p<.03$). High levels of reassurance were associated with high heart rate levels. Additionally, the interaction term of temperament and reassurance significantly predicted heart rate levels ($F=4.36, p<.04$). Figure 3-5 graphically represents the nature of this interaction. Difficult temperament children whose parents did not provide reassurance had lower heart rates than did those difficult children whose parents provided high amounts of reassurance. Easy temperament children whose parents provided high amounts of reassurance had lower heart rates than did those easy children whose parents provided low amounts of reassurance. Overall, the difficult temperament child whose mother did not provide reassurance had the lowest heart rate while the easy temperament child whose mother provided low amounts of reassurance had the highest heart rate.

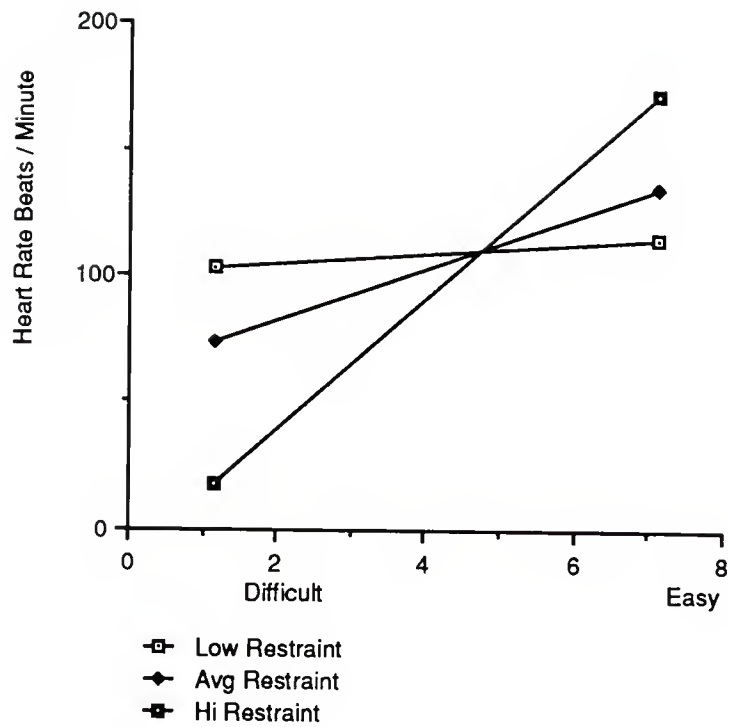
Maternal restraint and child temperament. The multiple regression model which included the variables of age, previous experience, overall temperament, maternal



Regression Lines Indicating the Relationship Between Children's Temperament and Reassurance as Predicting Heart Rate Levels.

Figure 3-5

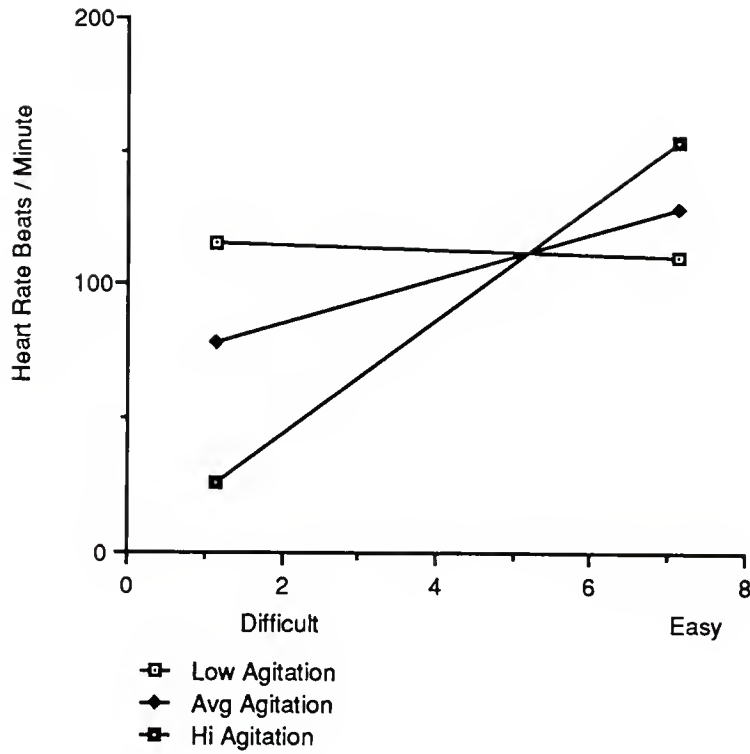
restraint and the interaction variable of overall temperament and maternal restraint as predicting children's heart rate levels was significant [$F(5,40)=2.53, p<.04$]. Together these variables achieved a multiple R of .49 accounting for approximately 24% of the variance. When the other variables in the equation were controlled for, maternal restraint was negatively associated with heart rate levels ($F=3.93, p<.05$). Mothers who tended not use restraint during the preoperative visit had children who had higher heart rates during the final phase of anesthesia induction. Additionally, the interaction of overall temperament and maternal restraint significantly predicted heart rate levels ($F=3.93, p<.05$). Figure 3-6 represents the nature of this interaction. Difficult temperament children whose mothers restrained them at high levels had lower heart rates than did those temperamentally difficult children whose parents did not use restraint. In contrast, easy temperament children whose parents did not tend to be restraining had lower heart rates than did those easy temperament children whose parents used restraint at high levels. Overall, difficult temperament children whose mothers tended to be highly restraining had the lowest heart rates, while easy temperament children whose mothers tended to be highly restraining had the highest heart rates.



Regression Lines Indicating the Relationship Between Children's Temperament and Maternal Restraint as Predicting Heart Rate Levels

Figure 3-6

Maternal agitation and child temperament. The multiple regression model which included the variables of age, previous experience, overall temperament, maternal agitation, and the interaction variable of temperament and agitation as predicting children's heart rate levels during the third phase of anesthesia induction was significant [$F(5,40)=2.50, p<.05$]. Together these variables achieved a multiple R of .49 which accounted for approximately 24% of the variance. When the other variables in the equation were controlled, maternal agitation was somewhat related to children's heart rate levels ($F=3.80, p<.06$). Mothers who were less agitated had children with higher heart rates during the third phase of anesthesia induction. Also, the interaction of temperament and agitation was somewhat predictive of children's heart rates ($F=3.74, p<.06$). Figure 3-7 graphs the interaction. Temperamentally difficult children with highly agitated mothers tended to have lower heart rates than did those difficult children with less agitated mothers. Temperamentally easy children with highly agitated mothers had higher heart rates than did those easy children with less agitated mothers. Overall, temperamentally difficult children whose mothers were highly agitated had the lowest heart rates, while temperamentally easy children whose mothers were highly agitated had the highest heart rates.



Regression Lines Indicating the Relationship Between Children's Temperament and Maternal Agitation as Predicting Heart Rate Levels.

Figure 3-7

CHAPTER IV DISCUSSION

This study explored children's adjustment to anesthesia induction and how this is related to temperament factors. Additionally, the relationship between maternal characteristics and on children's behavioral adjustment to anesthesia induction was investigated.

Temperament involves the style rather than content; that is, the how rather than the what or why of behavior (Plomin, 1982). Temperament is to be considered within the context of the environment. This interactionist approach necessitates the understanding of an individual's temperament within the environmental situation within which the behavior was demonstrated. Additionally, a parent's response to a child and the parent's accompanying child-rearing characteristics cannot be assessed without a simultaneous consideration of the child's temperament and their influence on the parent.

From this interactionist approach to temperament Thomas and Chess (1977) has used the concept of "goodness of fit." The goodness of fit model is a contextual one which stresses that psychosocial functioning can best be predicted when one places the individual within a specific context. Goodness of fit is the extent to which an

individual's characteristics are congruent with the demands of the environment. Therefore, those individuals whose characteristics are not congruent with environmental demands may have difficulties in adapting in various situations (Lerner, Lerner, Windle & Hooker, 1985).

Results from this study were based on data obtained at two different time points. Child temperament and mother-child interaction data were collected directly prior to the pre-operative clinic visit. One to two days later, observers rated children's behavior during anesthesia induction and recorded heart rate levels. Therefore, this study does not assess the direct or interactive impact of maternal behavior on child behaviors during anesthesia induction. Instead, it appears that the interaction between certain child temperament characteristics and certain maternal characteristics, sampled during the pre-operative assessment period, have implications for subsequent child behaviors during the anesthesia induction procedure in which the mother is not present.

Children's Temperament and Behavior During Anesthesia Induction

In general, very few findings were obtained which would indicate a direct relationship between child temperament and their behavior during anesthesia induction. Consistent with the existing literature, however, (Thomas & Chess, 1977) children's temperamental tendency to withdraw and show negative emotional responses to new or novel

situations was associated with a higher number of distress behaviors and being rated as less cooperative during the introductory phase of anesthesia induction as compared to children who show positive responses to new situations.

It is noteworthy that findings implicating a direct relationship between temperament and behavior were found only during the first phase of induction. Thomas and Chess (1977) suggest that pure temperamental expression is likely to be apparent only at those times when novel environmental challenges render coping skills ineffective. The temperamentally withdrawing child characteristically demonstrates negative emotional responses to novel or unfamiliar situations. The introductory phase of anesthesia induction marked the beginning of such an unfamiliar situation and it is postulated that a direct expression of temperament would be found in this phase. Thus, findings regarding children's negative withdrawal responses and distress behaviors during the initial stage of anesthesia induction would tend to support Thomas and Chess's hypothesis.

Goodness of Fit

The paucity of findings indicating a direct relationship between children's temperament and behavior during anesthesia induction supports the necessity for understanding a child's temperament within the context of the environment (Goldsmith, Buss, Plomin, Rothbart, Thomas,

Chess, Hinde and McCall, 1987). Within each environmental context there are behavioral demands. These demands may take various forms (Lerner et al. 1985). First, the demands may take the form of attitudes, values or expectations held by others regarding the child's physical or behavioral characteristics. Second, demands exist as a consequence of the behavioral attributes of others in the context with whom children must coordinate their behavioral attributes for adaptive interactions to exist. And third, the physical characteristics of a setting constitute contextual demands (Lerner et al., 1984). Thus, from this perspective, often termed the interactionist or "goodness of fit model" (Lerner, 1984; Thomas, Birch, Chess and Robbins, 1961) it is necessary to take into consideration not only the child's characteristics but also other individual's behaviors and the physical characteristics of the environment.

It was hypothesized that maternal behaviors displayed during the clinic visit would interact between children's temperament characteristics and their behavior during anesthesia induction. Findings from this study in fact, indicated that maternal behaviors had relevance in predicting children's reactions to anesthesia induction in the context their view of children's temperament characteristics. Some of the results included the findings that children with a difficult temperament had higher heart

rate levels during the third phase of anesthesia induction when their mothers displayed high rates of reassurance, low rates of restraint and agitation, or did not ignore them. For temperamentally easy children, low rates of maternal reassurance and high rates of restraint, agitation or ignoring were associated with higher heart rates during the third phase of anesthesia induction.

These findings regarding difficult temperament children may be considered counter intuitive. While the difficult child would be expected to have difficulties in coping in the medical setting (Thomas and Chess, 1977) previous research has found the parental use of ignoring or agitation to be associated with higher rates of child distress behavior in the medical setting (Bush, Melamed, Sheras and Greenbaum, 1986).

Maternal Patterns of Behavior

The findings from this study might be conceptualized within a parental involvement-noninvolvement paradigm. Here parental involvement would be seen as displaying high rates of reassurance and low rates of agitation and ignoring; and parental non-involvement would be defined as displaying low rates of reassurance and high rates of agitation and ignoring. For the easy temperament child better outcomes during anesthesia induction were associated with more maternal involvement; and for the difficult

temperament child better outcomes were associated with less maternal involvement.

While it would be predicted that children with components of a difficult temperament would have negative responses in unfamiliar situations (Thomas and Chess, 1977), this was found to be true only during phase one of anesthesia induction. No direct relationships between temperament characteristics and behavior during phase three of anesthesia induction were found. Thus, it becomes necessary to consider other factors which influenced children's behavior. As previously mentioned one significant influence may be maternal behavior. Previous research has examined maternal influences on children's coping behaviors in the medical setting. Bush et al. (1986) found that mothers who used high rates of reassurance and infrequently ignored their children were likely to have children who showed maladaptive responses prior to being examined by a physician. Gutstein and Tarnow (1983) investigated parenting behaviors as facilitating children's preparation for elective surgery. Parents of children between the ages of 6-9 who had a more active style of guiding the child's activities were more likely to interfere with the child's preparation for surgery. The Bush et al. (1986) and Gutstein and Tarnow (1983) studies provide data which indicate that parents do influence children's behavior in the medical setting and,

moreover support a maternal involvement-noninvolvement hypothesis. Specifically, both maternal reassurance and infrequent ignoring (Bush et al., 1986) and active parenting strategies (Gutstein and Tarnow, 1983) could be conceptualized as maternal "involvement" which was associated with less adaptive child outcomes. Results from this study, however, indicated a significant interaction between temperament and maternal behaviors as predicting children's behavior during anesthesia induction. That is, parenting behaviors led to different outcomes depending on children's temperament. It may therefore be necessary to examine another possible influencing factor on children's behavior during anesthesia induction.

Situational Components

Findings from this study were based on data collected in two different situations. Child temperament and mother-child interaction data were collected in the outpatient clinic, while ratings of children's behavior and recordings of their heart rate levels were collected in the surgical unit. One salient and important difference between these two situations is that during the pre-operative visit mothers were present, while during the anesthesia induction procedure mothers were absent. Additionally, the clinic visit contrasted with the anesthesia induction situation to the extent that mothers were involved or not involved with their children during the clinic visit. That is, difficult

temperament children of involved mothers might have been expected to have adverse reactions to the induction situation because of the marked contrast between the two situations.

Typically, during anesthesia induction children do not receive much reassurance and they are often restrained by both nurses and physicians. Findings from this study indicated that difficult temperament children whose mothers did not use restraining behaviors, had higher heart rates during the third phase of anesthesia induction. The similarity of the preoperative visit and the anesthesia induction situation would thus be heightened to the extent that mothers were not involved with their children during the preoperative visit. That is, mothers who were agitated and displaying high rates of ignoring and restraint, and low rates of reassurance may have served to increase the similarity between the two situations.

Thus, for the difficult temperament child maternal noninvolvement and maternal restraint behaviors may have served a useful function as it resulted in increased similarity between the two situations. In contrast, temperamentally difficult children with involved mothers, would have been expected to become more upset when placed in an unfamiliar stressful situation without their mothers (Shaw and Routh, 1982) due to the contrasting nature of the two situations. Easy temperament children of non-involved

mothers might not have been adequately prepared for the anesthesia induction situation. Previous research (Melamed & Siegel, 1975) has demonstrated that preparing children for a medical procedure can reduce children's distress. Additionally, Gutstein and Tarnow (1983) found that parents can facilitate this preparation. The easy temperament child might have then benefitted from pre-induction preparation from their mothers. For these easy temperament children tending to show approach behaviors towards new situations, one would not predict increased levels of distress as a function of the contrasting nature of the two situations and the newness associated with the anesthesia induction context.

Child Attachment and Maternal Involvement

Some of the findings from this study seemed to be contradictory. It was found that children who tended to withdraw from new stimuli and whose mothers provided distraction at high frequencies, displayed more distress behaviors during phase 1 of anesthesia induction than did those withdrawing children whose mother provided distraction at lower frequencies. In contrast, during phase 3 of anesthesia induction, those withdrawing children whose mothers provided low rates of distraction, demonstrated a higher number of distress behaviors than did the withdrawing child whose mother distracted at a high level. These findings may be explained within a maternal

involvement-noninvolvement framework, and with an attachment theory paradigm (Ainsworth, Blehar, Waters, & Wall, 1978; Sroufe, 1979).

Attachment relationships are thought to have important effects on psychosocial development (Bowlby, 1969). The accumulated clinical evidence and research findings strongly support the hypothesis that qualitative differences in child-mother attachment relationships are associated with qualitative differences in antecedent maternal behaviors and with different behavioral outcomes in the case of the child (Ainsworth et al. 1978). Sroufe (1979) writes that individual children elicit different reactions from the environment. When placed in a challenging situation children who are secure in their relationship with their mothers seek more assistance from their mothers. These mothers in turn maintain a high level of support towards their children. Ainsworth (1979) also reports that securely attached children are likely to become distressed during separation.

This study did not directly examine the nature of children's attachment to their mothers, however, as in the attachment literature, child and mother characteristics, and the associated child behavioral outcomes were investigated. Previous research has indicated that mother-child relationship characteristics can be considered a

mediating process between a difficult temperament and later behavior problems (Weber, Levitt & Clark, 1986).

It may be the case that those temperamentally withdrawing children whose mothers were involved with them and provided high amounts of distraction, were likely to become distressed when separated from their mothers. The first phase of anesthesia induction was immediately preceded by a separation of the child from the mother. With the temperamentally withdrawing child, distress displayed during the first phase of anesthesia induction may be thought of as distress related to the change in situations and as a separation protest. In contrast the easy temperament child may be able to more easily adjust to the change in situations but be anxious about the anesthesia induction procedure and display more distress behaviors during the third phase of anesthesia induction.

Limitations

Despite the intriguing nature of the findings presented here, there are several limitations of the present study. One involves parents' provision of child temperament ratings. Bates (1980) has suggested that parental ratings of children's temperament may represent "perceptions" rather than accurate reflections of behavior. From this perspective one concern would be that a parent's own characteristics may lead to bias reports of child temperament characteristics. Doelling (1987) and Sheeber

(1987) collected child temperament data provided by both mothers and teachers. While teacher and parental reports of child temperament were only moderately correlated, difference scores between the two reports indicated that parental ratings had no systematic bias. Doelling (1987) and Sheeber (1987) conclude that reports of child temperament are not likely to be a function of parental perceptions and are unlikely to represent a significant limitation to the degree that allows meaningful conclusions to be made regarding child temperament and outcome measures.

Another limitation concerns the qualification of children's prior experience with medical or surgical procedures (so as to control for prior experience to some degree). While data was collected regarding the number and type of previous medical procedures, information was not collected regarding the quality of these experiences. Melamed, Dearborn and Hermecz (1983) found that the quality of the child's prior experience was a significant factor in predicting children's reactions to medical stressors. In addition to temperament and mother-child interaction factors, future research will need to address the issue of the quality of the child's previous medical experiences.

Finally, in the course of this study many statistical analyses were completed. It is possible that some of these significant statistical results were spurious. The

consistent pattern of the findings, however, argue to some extent against the possibility of these results reflecting statistical artifacts.

Conclusions

The findings from this study are based on 60 parent-child dyads. Important individual differences were revealed in children's behavioral and physiological responses to anesthesia induction. Furthermore, the mothers' role as a mediator between temperament characteristics and children's adjustment in a medical situation was examined.

Only a limited number of temperament factors and maternal behaviors were directly related to children's adjustment to anesthesia induction. Instead, temperament variables including approach/withdrawal, and the overall temperament score in interaction with the maternal behaviors of ignoring, restraint, reassuring, agitation, and distraction were the best predictors of children's behavior during anesthesia induction. Both difficult and easy temperament children displayed a higher number of distress behaviors and had higher heart rates levels depending on maternal behavior. The difficult child was adversely affected by less ignoring, restraint and agitation, more reassurance and varying amounts of distraction. The easy child, in contrast was adversely affected by high rates of ignoring, restraint and

agitation, less reassurance and varying amounts of distraction. These findings support the view that maternal behaviors cannot be judged as either "good" or "bad." Rather it appears that a "goodness of fit" or "poorness of fit" exists between dyads in different situations. In this study a "goodness of fit" appeared to have existed between difficult temperament children and non-involved mothers, and an easy temperament child and an involved mother. A "poorness of fit" was present when temperamentally difficult children interacted with involved mothers, and when easy temperament children interacted with uninvolved mothers.

Future research will need to make several methodological improvements. Significant relationships were found between children's temperament and mother child interaction sequences 1 to 2 days prior to being admitted for surgery, as predicting children's behavior during anesthesia induction. It is postulated that these relationships would have greater predictive validity if mother-child interactions were recorded on the day of surgery on the surgical unit.

The results from this study have various implications with regard to possible interventions. One such intervention may involve policy changes regarding parents' presence in the operating room. At present, parents are generally not allowed into the operating room unless the

child becomes extremely upset and disruptive during the induction procedure. Hannallah and Rosales (1983) reported findings regarding parents' presence during anesthesia induction in children. Those children whose parents were present during induction were rated as having more positive mood scores during the pre-induction and induction periods. Additionally, no major or minor complications or side effects were attributed to the presence of parents in the induction area. Interestingly, the parents who were present with their children during anesthesia induction were self-selected. It might be beneficial for some children to have their parents accompany them into the operating room. Another intervention indicated by the findings from this study involves the institution of surgery and anesthesia induction preparation programs for children. Those children who would seem to especially benefit from such a program might include the difficult temperament child with the involved mother and the easy temperament child with the uninvolved mother. The difficult child would have the opportunity to become somewhat familiar with the procedures and personnel present in the operating room, and thereby possibly avert a negative withdrawal response; and the easy temperament child could have some of their anxiety allayed regarding the induction procedures.

APPENDIX A
BACKGROUND INFORMATION INTERVIEW FORM

Child's Name _____ Subject No. _____
Clinic _____ Date _____
Hospital No. _____ Interviewer _____
Age and sex of siblings _____
Date of birth _____ Sex _____ Race _____
Accompanying parent _____ Age _____
Father: Occupation _____ Education _____ Income _____
Mother: Occupation _____ Education _____ Income _____

Previous Medical Experience (reason and date):

- 1) Surgery _____
- 2) Other Hospitalizations _____
- 3) This clinic _____
- 4) Other clinic/outpatient _____
- 5) Siblings hospitalized _____
- 6) Parent's hospitalized _____

How do you think your child has reacted to past medical procedures?

1. Very poorly 2. Moderately poorly 3. Moderately well
4. Very well

How do you think your child will react to this medical visit?

1. Very poorly 2. Moderately poorly 3. Moderately well
4. Very well

How do you rate your child's anxiety (fear nervousness) at this moment?

1. Very high 2. Moderately high 3. Moderately low
4. Very low

How would you rate your own anxiety (fear nervousness) at this moment?

1. Very high 2. Moderately high 3. Moderately low
4. Very low

How stressful has it been for you to deal with your child's current health problem--the reason you are here today?

1. High stress 2. Moderately high 3. Moderately low
4. Low stress

APPENDIX B
OPERATING ROOM BEHAVIOR RATING SCALE--REVISED
(Lumley & Melamed)

Subject name: _____ Number: _____ Date: _____

Anesthesiologist: _____ Resident: _____ Rater: _____

1. Leaving the child's parent to go to the operating room until the child is to be transferred to the operating room table.

- _____ crying
- _____ frowning
- _____ screaming
- _____ calling for parent (or other friend or guardian)
- _____ kicking
- _____ flinging arms
- _____ body tense and stiff
- _____ attempts to leave bed or doctor (if being walked)
- _____ repetitive movements (rocking leg or arm moving back and forth, etc.)
- _____ does not answer questions or greetings

OPERATING ROOM COOPERATION RATING SCALE

1. TOTAL UNCOOPERATION: much restraint is needed, fights the staff, much violent movement, tries to escape.
2. protests are loud and disruptive, restraint or force is used by staff, much motor activity.
3. protests interfere with procedure, staff delays to calm child, compliance achieved after a short period, moderate motor activity.
4. protests occasionally, not attending to the requests of the staff, some body movements.
5. protests a little, slight body movements, little responsiveness, complies when requested but needs prompting or help.
6. is quietly responsive, complies with requests, no extra effort at being cooperative, no protestations.
7. TOTAL COOPERATION: very helpful, acts on own when requested, no protestations, ideal working conditions.

Subject number: _____

2. Transfer to the operating room table until mask or needle is viewed by child

- _____crying
- _____frowning
- _____screaming, vocalizing
- _____calling for parent (or other friend or guardian)
- _____kicking
- _____flinging arms
- _____body tense and stiff
- _____attempts to leave the table
- _____repetitive movements (rocking, leg or arm moving back and forth, etc.)
- _____does not answer questions or greetings
- _____resists the physiological hook-ups

OPERATING ROOM COOPERATION RATING SCALE

1. TOTAL UNCOOPERATION: much restraint is needed, fights the staff, much violent movement, tries to escape.
2. protests are loud and disruptive, restraint or force is used by staff, much motor activity.
3. protests interfere with procedure, staff delays to calm child, compliance achieved after a short period, moderate motor activity.
4. protests occasionally, not attending to the requests of the staff, some body movements.
5. protests a little, slight body movements, little responsiveness, complies when requested but needs prompting or help
6. is quietly responsive, complies with requests, no extra effort at being cooperative, no protestations.
7. TOTAL COOPERATION: very helpful, acts on own when requested, no protestations, ideal working conditions.

Subject number: _____

3. View of the mask or needle until 30 seconds (15 seconds for I.V.) after induction begins.

- _____crying
- _____frowning
- _____screaming, vocalizing
- _____calling for parent (or other friend or guardian)
- _____kicking
- _____flinging arms
- _____body tense and stiff
- _____attempts to leave the table
- _____repetitive movements (rocking, leg or arm moving back and forth, etc.)
- _____does not answer questions or greetings
- _____turns head away from mask/pulls arm away from needle
- _____pushes away mask/needle
- _____pulls at physiological hook-up wires

OPERATING ROOM COOPERATION RATING SCALE

1. TOTAL UNCOOPERATION: much restraint is needed, fight the staff, much violent movement, tries to escape.
2. protests are loud and disruptive, restraint or force is used by staff, much motor activity.
3. protests interfere with procedure, staff delays to calm child, compliance achieved after a short period, moderate motor activity.
4. protests occasionally, not attending to the requests of the staff, some body movements.
5. protests a little, slight body movements, little responsiveness, complies when requested but needs prompting or help.
6. is quietly responsive, complies with requests, no extra effort at being cooperative, no protestations.
7. TOTAL COOPERATION: very helpful, acts on own when requested, no protestations, ideal working conditions.

Cooperation rating by anesthesiologist:

1	2	3	4	5	6	7
uncooperation					cooperation	

APPENDIX C
SAMPLE CHARACTERISTICS: PARENT TEMPERAMENT QUESTIONNAIRE

	<u>M</u>	<u>SD</u>	<u>Range</u>
Mood	5.06	.89	1.88-6.63
Distractability	4.54	1.03	1.57-6.38
Persistence	4.18	.85	1.71-6.00
Activity	4.09	.98	2.25-6.25
Rhythmicity	4.58	.94	2.50-7.50
Adaptability	5.16	.96	1.75-6.88
Approach/Withdrawal	4.60	1.13	1.38-6.71
Threshold	3.40	.85	1.38-5.57
Intensity	3.70	1.00	1.88-5.88
Difficult Temperament	4.77	.57	3.43-6.01

APPENDIX D
SIGNIFICANT MULTIPLE REGRESSION MODELS

	F	P
<u>Phase 1 of Anesthesia Induction</u>		
a. <u>Distress Behaviors</u>		
$\underline{F}(5,49) = 2.40, \underline{p} < .05, \underline{R}^2 = .20$		
<u>Source</u>		
Age	2.19	.15
Previous Experience	.14	.71
Approach/Withdrawal	4.33	.04
Information	1.03	.31
Approach/Withdrawal X Information	.21	.65
b. <u>Cooperation Level</u>		
$\underline{F}(3,51) = 3.13, \underline{p} < .03, \underline{R}^2 = .16$		
<u>Source</u>		
Approach/Withdrawal	6.29	.02
Information	3.56	.06
Approach/Withdrawal X Information	2.55	.12
c. <u>Distress Behaviors</u>		
$\underline{F}(5,49) = 4.09, \underline{p} < .004, \underline{R}^2 = .29$		
<u>Source</u>		
Age	1.78	.19
Previous Experience	.37	.54
Approach/Withdrawal	.91	.34
Distraction	8.65	.005
Approach/Withdrawal X Distraction	5.88	.02

Phase 3 of Anesthesia Induction

- a. Distress Behaviors
 $\underline{F}(5,52) = 2.39, \underline{p} < .05, \underline{R}^2 = .19$

<u>Source</u>		
Age	2.07	.16
Previous Experience	4.60	.04
Approach/Withdrawal	1.71	.20
Distraction	5.70	.02
Approach/Withdrawal X Distraction	5.42	.02

- b. Heart Rate Levels
 $\underline{F}(5,40) = 3.19, \underline{p} < .02, \underline{R}^2 = .28$

<u>Source</u>		
Age	5.11	.03
Previous Experience	1.59	.22
Overall Temperament	.15	.70
Ignoring	6.29	.02
Temperament X Ignoring	6.58	.01

- c. Heart Rate Levels
 $\underline{F}(5,40) = 2.92, \underline{p} < .02, \underline{R}^2 = .27$

<u>Source</u>		
Age	4.90	.03
Previous Experience	1.51	.23
Approach/Withdrawal	.11	.74
Ignoring	4.14	.05
Approach/Withdrawal X Ignoring	4.58	.04

- d. Heart Rate Levels
 $\underline{F}(5,40) = 3.14, \underline{p} < .02, \underline{R}^2 = .28$

<u>Source</u>		
Age	3.31	.08
Previous Experience	1.86	.18
Overall Temperament	6.41	.02
Reassurance	4.98	.03
Temperament X Reassurance	4.36	.04

- e. Heart Rate Levels
 $\underline{F}(5,40) = 2.53, \underline{p} < .04, \underline{R}^2 = .24$

<u>Source</u>		
Age	7.86	.008
Previous Experience	2.70	.11
Overall Temperament	.28	.60
Restraint	3.93	.05
Temperament X Restraint	3.93	.05

f. Heart Rate Levels

$$\underline{F}(5,40) = 2.50, \underline{p} < .05, \underline{R}^2 = .24$$
Source

Age	5.23	.03
Previous Experience	2.99	.12
Overall Temperament	.05	.83
Agitation	3.80	.06
Temperament X Agitation	3.74	.06

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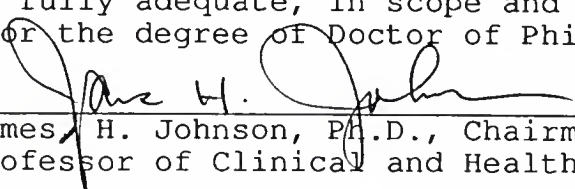
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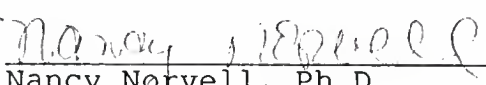
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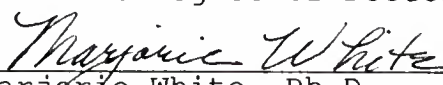
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